

REMARKS

Claims 1-14 were examined and rejected. Applicants amend claims 1 and 11. Applicants respectfully request reconsideration of claims 1-14, as amended, in view of at least the following remarks.

I. Claims Rejected Under 35 U.S.C. § 112

The Patent Office rejects claim 11 under 35 U.S.C. § 112, second paragraph, because claim 11 recites the limitation, "at least two metals" in line 2. Applicants amend claim 11, and assert that claim 11 as amended does not lack proper antecedent basis. Hence, Applicants respectfully request that the Patent Office withdraw the rejection above.

II. Claims Rejected Under 35 U.S.C. § 103

The Patent Office rejects claims 1-14 under 35 U.S.C. § 103 as being unpatentable over 5,120,925 to Onishi et al. (Onishi), in view of 4,908,226 to Kubena et al. (Kubena), 5,182,231 to Hongo et al. (Hongo), and 5,132,248 to Drummond et al. (Drummond). To render a claim obvious, all elements of the claim must be taught or suggested by at least one properly combined reference of the combination.

First, Applicants respectfully disagree with the rejection above and submit that independent claim 1, as amended, is patentable over the cited references for at least the reason that the cited references do not teach or suggest a system having a controller configured to control the introduction of a focused ion beam to form at least one metal layer over a substrate, and instructions for controlling a coherent electromagnetic radiation source applied to a top surface of the at least one metal layer to heat the at least one metal layer, as required by amended claim 1.

As admitted by the Patent Office, Onishi fails to teach or suggest the above-noted limitation of claim 1.

Drummond describes a process for forming metal or dielectric depositions to form multiple layers on a substrate (see col. 4, lines 13-20, and col. 6, lines 63-68). To do this, Drummond teaches depositing materials by an inkjet printing technique to deposit or write material formulated as colloidal suspension directly onto a substrate surface, such as via a piezoelectric driven jet system (see col. 3, lines 56-67). More particularly, Drummond teaches a colloidal content of a suspension between 1 and 20% by weight, keeping an ambient temperature around the substrate below 150°C and annealing the colloidal deposition using a low power laser to homogenize and resolve the desired pattern, and to provide adhesion between the pattern and the substrate without localizing melting of the substrate or excessive volatilization of the colloidal material (see Drummond, col. 5, lines 10-58). Thus, Drummond teaches a low power laser to adhere a colloidal suspension applied by inkjet printing to a substrate without melting the substrate or causing excessive volatilization of the colloidal material. Consequently, the Patent Office has not identified and Applicants are unable to find any teaching or suggestion in Drummond that accounts for instructions for controlling a coherent electromagnetic radiation source applied to a top surface of at least one metal layer formed using a focused ion beam, as required by claim 1.

Kubena discloses heating element 28 around which electrically heating wire 30 is coiled to heat substrate 32 which is placed on top of heating element 28 (Kubena, col. 4, lines 29-43). Thus, Kubena uses a heating wire to generate heat which is conducted to the bottom of the substrate through heating element 28. Consequently, the Patent Office has not identified and Applicants are unable to find any teaching or description in Kubena that accounts for a coherent electromagnetic radiation source applied to a top surface of at least one metal layer formed on a substrate, as required by amended claim 1.

Hongo teaches using a focused ion beam, or alternatively, using a laser beam during chemical vapor deposition (CVD) (see Hongo, col. 3, lines 5-8, and lines 18-23; and col. 16, lines 19-29). Thus, Hongo teaches either using a laser during CVD, or in the alternative, using an ion beam during CVD deposition. Consequently, the Patent Office has not identified and Applicants are unable to find any teaching or description in

Hongo of depositing a layer on a substrate using a focused ion beam, and controlling a coherent electromagnetic radiation source applied to a top surface of the metal layer, as required by amended claim 1 .

Hence, since neither Onishi, Drummond, Kubena, Hongo, nor the combination teach the limitation of amended claim 1 noted above, Applicants respectfully request the Patent Office withdraw the rejection above of claim 1 for this first reason.

Second, Applicants assert that Drummond cannot be properly combined with Onishi. Onishi teaches a technology using a focused ion beam and a metal containing gas to provide etching, transplantation, and repair of electronic devices already existing on a substrate (see Abstract). On the other hand, as noted above, Drummond teaches a low power laser to adhere a colloidal suspension applied by inkjet printing. Thus, Applicants do not believe that either reference provides a motive for combining a low power laser to adhere a colloidal suspension applied by an inkjet printing system with a focused ion beam and gas technology for providing etching, transplantation, and repair of electronic devices already existing on a substrate. In fact, Applicants are not sure that the low power laser annealing to adhere the colloidal material of Drummond would have any benefit or affect on the focused ion beam deposited metal of Onishi. Therefore, Applicants can only conclude that the motive to combine the references includes knowledge gleaned only from Applicants' disclosure. Hence, Applicants assert that the combination of Onishi with Drummond is the result of impermissible hindsight, in accordance with MPEP § 21.45.X.A. Thus, Applicants respectfully request that the Patent Office withdraw the above rejection of claim 1, for this second reason.

Third, claim 1 includes a memory coupled to the controller comprising a computer-readable medium having a computer-readable program having the instructions for controlling the energy source from which the introduction of the focused ion beam is controlled, and instructions for controlling the coherent electromagnetic radiation source applied to the top surface of the metal layer formed by the focused ion beam. As previously noted, the Patent Office agrees that Onishi fails to teach this limitation. In addition, the Patent Office has not identified and Applicants are unable to find any teaching in Drummond of a memory having instructions for

controlling a coherent electromagnetic radiation source applied to a top surface of a metal layer formed by a focused ion beam, as required by amended claim 1. Similarly, Kubena teaches heating element 28 having heating wire 30 controlled by temperature control mechanism 35 (see col. 4, lines 29-44), but has no indication of how the controller is controlled. For instance control mechanism 35 could be passive electronic circuitry or a thermo mechanism device, attached to a power source to control current provided to wire 30. Thus, the Patent Office has not identified and Applicants are unable to find any teaching in Kubena of the computer program instructions limitations noted above.

Finally, since Hongo teaches either focused ion beam, or in the alternative, laser during CVD, Hongo teaches against a memory having instructions for controlling a focused ion beam to form a metal layer and instructions to control a coherent electromagnetic radiation source applied to a top surface of a metal layer formed by the focused ion beam. Therefore, Applicants are unable to ascertain how the teaching of Hongo (which teaches away from the above-cited limitation of claim 1), Drummond (which does not teach the limitations and cannot be properly combined with Onishi), and/or Kubena (which does not teach or suggest computer control of control mechanism 35), allows computer 500 of Onishi to be boot-strapped into including a memory having instructions to perform the above-noted limitations of amended claim 1, which none of the references teach or suggest. Thus, Applicants traverse the above assertion by the Patent Office and request that the Patent Office cite a reference in support of that position, in accordance with MPEP § 2144.03. Hence, Applicants respectfully request that the Patent Office withdraw the rejection of amended claim 1 for at least this third reason.

Applicants submit that dependent claims 2-12 being dependent upon allowable base claim 1, as amended, as patentable over the cited references for at least the reasons explained above. Thus, Applicants respectfully request that the Patent Office withdraw the rejections of dependent claims 2-12 being unpatentable over the cited references.

In addition, Applicants respectfully traverse the Patent Office's assertion regarding claims 11 and 12 that "it would have been obvious to one of ordinary skill in

the art at the time the invention was made to include a plurality of metal precursor gases in order to introduce different metal precursor gases into the chamber separately or simultaneously as desired," under MPEP § 21.44.03 and request that the Patent Office cite a reference in support of that position. Specifically, instructions for introducing more than one precursor gas, or for controlling introducing at least two of cobalt, metal carbonyl, molybdenum, platinum, and tungsten in a controlled ratio are not a mere duplication of parts because the combination of gases can form a layer using FIB deposition that is a two metal alloy layer and has properties of an alloy, which is an unexpected result as compared to instructions for introducing and controlling introduction of just one of the above materials to form a layer of only one metal. Hence, for at least this second reason, Applicants respectfully request that the Patent Office withdraw the above rejection of claims 11 and d12.

III. Double Patenting

The Patent Office provisionally rejects Claims 1-14 under the judicially created Doctrine of Obvious Type Double Patenting as being unpatentable over claims 1-6 of copending application 10/209,453. Applicants thank the Patent Office for pointing out the provisional rejection and defer response to the provisional double patenting rejection until a time the provisional rejection becomes non-provisional.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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By: _____

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on September 10, 2004.

Susan M. Barrette

9/10/2004

Date